TEXAS TECH UNIVERSITY
Department *of* Electrical
& Computer Engineering

WELCOME

Dear New and Returning Students,

Congratulations and welcome to Texas Tech University! We are excited that you are joining our vibrant graduate and professional student community.

We are here to ensure you find a stimulating intellectual and social community of students and scholars from across the department and university. The following handbook is a guide to the department's graduate degree requirements and resources, and is intended as an aid for you from your first semester through graduation.

If you have concerns, or need more information, please feel free to email me or visit me in my office (224D).

Sincerely,

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2. MASTER'S PROGRAM

2.1. M.S.E.E. Thesis Option

Students must take 30 credit hours, plus 1 credit hour per semester of ECE 5120 Graduate Seminar. By the end of the program, students complete a thesis, and deliver an oral defense of the results. The thesis option degree consists of 24 credit hours of coursework and 6 credit hours of thesis. At most, 6 of the 24 coursework hours may be non-ECE courses, and 3 of the 24 coursework hours may be ECE individual study courses. Up to 6 hours of coursework can be transferred into the program. To declare the thesis option, students submit a Degree Plan to the department's academic administrative coordinator, for submission to the Graduate School.

Students must pass the Fundamentals of Engineering (FE) Examination. It is highly recommended to take the FE Examination within your first semester, as it focuses on material learned as an undergraduate engineering student.

Thesis Option Summary:

- Required Program GPA: 3.0 or above.
- Complete 30 credit hours total.
- 24 of the 30 credits must be coursework.
- 6 of the 30 credits must be ECE 6000, Master's Thesis.
- Enroll in ECE 5120 Graduate Seminar every semester.
- ECE 5371 Engineering Analysis is required of all ECE graduate students.
- Complete a Degree Plan your second semester.
- At most, 6 of the 24 coursework hours may be non-ECE courses.
- At most, 3 of the 24 coursework hours may be ECE individual study courses (ECE 5331).
- Complete a thesis and deliver an oral defense of the results.
- Pass the Fundamentals of Engineering (FE) Examination. **Two** failed attempts at the FE is an automatic dismissal from the Graduate School.

2.2. M.S.E.E. Non-Thesis Option

Students must take 36 credit hours, plus 1 credit hour per semester of ECE 5120 Graduate Seminar. At most, 9 of the 36 credit hours may be non-ECE courses, and 6 of the 36 credit hours may be ECE individual study courses. Up to 6 of the 36 credit hours can be transferred into the program.

Students must pass the Fundamentals of Engineering (FE) Examination. It is highly recommended to take the FE Examination within your first semester, as it focuses on material learned as an undergraduate engineering student.

Non-Thesis Option Summary:

- Required Program GPA: 3.0 or above.
- Complete 36 credit hours total.
- Enroll in ECE 5120 Graduate Seminar every semester.
- ECE 5371 Engineering Analysis is required of all graduate students.
- At most, 9 of the 36 hours may be non-ECE courses.
- At most, 6 of the 36 hours may be ECE individual study courses (ECE 5331).
- At most, 6 of the 36 hours of coursework can be transferred into the program.
- Pass the Fundamentals of Engineering (FE) Examination. **Two** failed attempts at the FE is an automatic dismissal from the Graduate School.

2.3. Time Limit, Credit Limit

Work credited toward a master's degree must be completed within 6 years. Once a master's student has completed their degree credits and requirements, they may not enroll in additional spring or fall semesters.

3. PH.D. PROGRAM

PhD students must take 60 credit hours of graduate coursework and 12 credit hours of dissertation, for a total of 72 degree hours. In addition, PhD students are required to enroll in 1 credit hour per semester of ECE 5120 Graduate Seminar until becoming a candidate. Up to 30 credits can be transferred into the PhD program.

At most, 27 of the 60 coursework hours can be taken as ECE 5331 or ECE 7000. PhD students may take no more than 18 hours of the ECE 5331 course. ECE 7000 courses involve an agreement between a student and a faculty member in which the student carries out assignments in a subject not available in a regular course.

Your Degree Plan is submitted following your first semester of enrollment (or the completion of 9 hours). PhD students must pass the Fundamentals of Engineering (FE) Exam, if they have not already done so as a master's student. The PhD program also requires students to publish 2 scholarly publications before their dissertation defense.

PhD Program Summary:

- Required Program GPA: 3.5 or above.
- Complete 72 credit hours total.
- 60 of these credits must be coursework.
- 12 of these credits must be ECE 8000, Dissertation.
- At most, 30 of the 60 coursework hours may be transferred into the program.
- Enroll in ECE 5120 Graduate Seminar every semester until becoming a candidate.
- ECE 5371 Engineering Analysis is required, if not already taken as a masters student.
- Complete a Degree Plan your second semester.
- At most, 27 of the 60 coursework hours can be taken as ECE 5331 or ECE 7000.
- At most, 18 hours of individual study coursework can be taken as ECE 5331.
- 2 scholarly publications accepted or published prior to your dissertation defense.
- Pass the Fundamentals of Engineering (FE) Examination, if not already passed as a master’s student.
- Complete a dissertation and deliver an oral defense of the results.

3.1 Time Limit, Credit Limit

All requirements for the doctoral degree must be completed within a period of 8 consecutive calendar years or 4 years from admission to candidacy, whichever comes first.

In addition, the doctoral degree must be completed within 99 credit hours.

3.2 Qualifying Exam

To become a PhD candidate in Electrical and Computer Engineering students must complete a Qualifying Exam, also commonly referred to as a proposal defense.

Prior to the Qualifying Exam, PhD students must complete the following requirements:

- Pass the Fundamentals of Engineering (FE) Exam, if you have not already done so prior to your PhD program.

- Publish, or have accepted, at least 1 paper in a peer-reviewed academic journal approved by the student's committee by the time of the proposal defense. The publication must be on the research the student conducted while completing their PhD.

Note: The Qualifying Exam cannot take place the same semester as the dissertation defense.

The Qualifying Exam consists of a proposal on the student's research plans for his/her dissertation. The student presents his/her proposal to their dissertation committee, consisting of the Committee Chair and at least two other faculty members.

Once completed, the committee chair signs a form called the Qualifying Exam Report, which the student submits to the department. After the Graduate School approves the Qualifying Exam Report, the student is officially a PhD Candidate.

3.3 Guidelines for Dissertation Defense

From the Texas Tech University Graduate School:

Scheduling and Announcement

The final oral examination over the general field of the dissertation is required of all candidates for doctoral degrees, with the exception of the Doctoral of Musical Arts degree. The doctoral defense should be scheduled *at least four months after* the student has been admitted to candidacy and a suitable time *after the dissertation has been read* by the student's advisory committee. The student should NOT be allowed to defend research without a finished dissertation; it is the dissertation document that is being defended by the student, NOT the research itself. The examination is a formal public affair; **therefore, it should be held during weekday business hours when classes are in session and not during break periods.** A defense may begin as late as 4:30 p.m. in the afternoon. The examination should be held in a University room conducive to attendance by faculty members and students or with facilities conducive for electronic participation if necessary.

At least **three weeks before the date of the examination**, the candidate should submit the signed notification form to the Dissertation Supervisor via the Graduate School's SharePoint site. Only forms submitted electronically via SharePoint will be accepted; paper forms will be shredded. The Dissertation Supervisor and the Dean's representative should be notified as soon as possible when it becomes necessary for a doctoral examination to be postponed.

Graduate Dean's Representative

The student and the committee recommend a Graduate Dean's representative to the Graduate School, and the Graduate School reserves the right to approve or disapprove of the student's choice of representative. The Dean's representative is a member of the Graduate Faculty whose responsibility is to observe the conduct of the final examination. The representative shall have access to the dissertation and may participate in questioning the candidate. Representatives must be chosen from *departments outside the student's program and department*. The Thesis-Dissertation Oral Defense Approval Form has a line for the representative to sign signifying their approval of the conduct of the final exam. A Deans Representative's Report Form is available should a representative feel the need to comment on the examination.

Conduct of the Examination

The chairperson of the advisory committee should convene the examination by introducing the candidate, giving his or her background, and indicating the general format of the proceedings to follow, although there may be variations from department to department.

Initially, the candidate should give an overview of his or her study for the benefit of those in attendance who have not read the dissertation (15 to 30 minutes). After this, under the guidance of the chairperson, the candidate may be questioned by members of his or her committee, the representative, and other audience members. As indicated earlier, the examination is a public affair and the candidate should be prepared to defend her or his work before anyone who may question it. A copy of the dissertation (not necessarily in final form) should be available for reference during the examination.

When ample opportunity has been given for this discussion, those not on the doctoral committee should be excused while the committee and the Dean's representative ask further, possibly more detailed, questions regarding both the dissertation and its research procedures. The candidate should then be dismissed from the room while the committee comes to a decision concerning the results of the examination. When the decision is made, the chairperson should inform the candidate of the outcome and electronically submit the Thesis-Dissertation Oral Defense Approval form to the Graduate School via SharePoint.

Committee Approval

All members of the dissertation committee must approve of the document before it is submitted to the Graduate School via the Texas Tech University Library's Vireo server for the approval of the Graduate Dean.

The options for handling a situation in which a majority of the members of a student's examining committee vote to pass the student's examination, but there is a dissenting vote include the following:

1. The members may all agree on appropriate changes in the final form of the dissertation that resolve the objections of the dissenting member.

2. The dissenting member may accept the majority vote as a committee decision and agree to sign the dissertation.

3. A member voting against approval, and refusing to sign the dissertation as a matter of principle, may resign from the committee, in which case another member may be appointed as a replacement (if needed to make the minimum of three), and the dissertation may be approved. The chairperson must notify the Graduate Dean by letter of the replacement member, who must be approved by the Dean.

4. A member voting against approval may refuse to sign the dissertation and may not be willing to resign from the committee. In such a case, the matter should be referred to the Graduate School for review and assistance in solving the problem.

It is stressed that occasions when committee members vote against approval rarely occur when all of the committee members work closely with the student throughout the preparation of his or her dissertation.

PHD PROGRAM FLOWCHART

Prelim Exam: FE Exam
- Take and pass FE Exam **before** candidacy

Publication Requirement
- **1st** of required 2 research publications accepted **before** candidacy

Qualifying Exam: Become a Candidate
- Proposal defense: 1 page summary with future research plans
- Submit Qualifying Exam Report to department

Publication Requirement
- **2nd** of required 2 research publications accepted **before** dissertation defense

Defense and Dissertation
- Assemble dissertation committee and schedule defense
- Turn in dissertation to committee **before defense** and defend PhD work

Submit Grad School Requirements
- Complete dissertation approval forms
- Create ETD account and submit approved dissertation
- Pay dissertation fee

4. ACCELERATED BACHELOR'S TO MASTER'S PROGRAM

Computer Engineering or Electrical Engineering

Undergraduate students at Texas Tech University who are majoring in Electrical Engineering or Computer Engineering may apply to our Accelerated Bachelor's to Master's Program. This program is intended for our best undergraduates who wish to stay on for a master's degree. Students in the program get an early start on master's work by taking 3 graduate courses in their senior year, in place of 3 senior elective courses, to complete their B.S.E.E. or B.S. Comp. E. Degree. They then take graduate courses the following year and carry out their M.S.E.E. degree.

Students interested in the program are welcome to contact either the ECE Associate Chair for Graduate Studies, or the graduate program coordinator. It is highly recommended that students consult with their Computer Engineering or Electrical Engineering undergraduate advisor for the logistical details of enrolling in graduate level credits, etc., to ensure a smooth transition between undergraduate and graduate status.

5.PROGRAM AREAS

Graduate students can find thesis and dissertation topics in a variety of areas, with research conducted in the following multidisciplinary centers, laboratories, and industry-sponsored programs:

- Center for Pulsed Power and Power Electronics (P3E)
- Nano Photonics Center
- Nano Tech Center (NTC)
- Wireless Communication Systems Laboratory
- Biomedical Integrated Devices and Systems (BIDS)
- Applied Vision Laboratory (AVL)
- Micro-Electric-Mechanical Systems (MEMS)
- Neuroimaging, Cognition, and Engineering Laboratory (NICE)
- Microwave and Antenna Laboratory
- Program for Semiconductor Product Engineering (PSPE)
- Advanced Electronic Systems Engineering Program

6.SCHOLARSHIPS

The Whitacre College of Engineering offers externally funded scholarships. All students who receive a scholarship will be contacted via email with their scholarship details and donor name. Once a scholarship is awarded, a donor thank you letter must be submitted to Jenny Erdmann before scholarship funds are allowed to be released. After attaining the name of your scholarship donor, you will use the letter template in section 9.1 of this handbook.

Scholarships are competitive, and if your GPA falls below 3.5 you risk losing your scholarship. All scholarship recipients are required to attend the IEEE banquet held every April.

7.COURSE REGISTRATION

Class schedules can be located two ways:

- On Raiderlink under the "Look up Classes" link
- At registration.texastech.edu under the "Browse for Classes" link.

You may also choose to use the "Plan Ahead" feature which allows you to plan for an upcoming registration and use that plan when you become eligible to register.

Any late changes in course offerings (added or deleted, etc.) will be communicated by email and updated on Raiderlink.

See **Instructions for Registering for Classes Using CRNs**.

ECE 6000, ECE 7000, and ECE 8000 are variable credit courses, meaning students select the number of credit hours they wish to enroll in for those specific sections. See Instructions for Changing Variable Credit Hours

Requirements to Consider:

- Full-time status is a minimum enrollment of **9 hours** in a spring or fall semester.
- Full-time status is required for students who are international, as well as those employed by TTU or receiving a department scholarship.
- Students employed by the university (RA, TA, etc.) are required to be full-time during the term for which they are employed. This includes summers if they are employed during the summer.
- ALL graduate students are required to enroll in ECE 5120 Graduate Seminar each semester. PhD students are required to enroll in Graduate Seminar until they become a candidate.
- Thesis or PhD students who have started enrollment in ECE 6000/ECE 8000 must remain continuously enrolled in the course (minimum 3 hours) each term until graduation. This includes summers.

8.INTERNATIONAL STUDENTS: CPT, OPT

Off-campus internships for international students (Curricular Practical Training, CPT) cannot be obtained before completion of two regular semesters (spring and fall).

From the Texas Tech University Office of International Affairs:

Curricular Practical Training (CPT):

Curricular Practical Training is authorized by an International Student Counselor with an endorsement on your I-20 form. No application to DHS or an EAD card is required. The I-20 endorsement provides specific dates for beginning and ending authorization and specifies the employer and site of work. The endorsement must be obtained before work begins.

Curricular Practical Training can be either full-time, which does require at least a minimal enrollment, or part-time (up to 20 hours per week of work), which requires full-time enrollment. Full-time CPT of 12 months or more makes F-1 students ineligible for subsequent Optional Practical Training.

Application Procedures:

- Obtain an internship offer letter from the company that is offering you the position.
- Obtain an academic advisor's Letter for Curricular Practical Training on letterhead providing required CPT information. Required information includes a description of the work experience, name of employer, beginning and ending dates of employment, and explanation of how the experience will be monitored and graded. (A sample letter is available on the Office of International Affairs website)
- Obtain a new I-20 with the CPT authorization on page two from your international student counselor.

Optional Practical Training (OPT)

What is Optional Practical Training (OPT)?

Optional Practical Training is used by students to gain work experience in their field of study after completing a degree program. There are certain other situations in which OPT may be possible prior to the completion of a degree program.

How long can I do OPT?

Student Exchange Visitor Program (SEVP) regulations allow up to 12 months of OPT at each degree level for a student in F-1 status. Science, technology, engineering, and math (STEM)

students are eligible for an extension of 24 months of OPT.

When can I apply for OPT and How?

An application for post-completion OPT can be filed up to 90 days prior to the student's completion date and no later than 60 days after the student's program completion date.

How long does the OPT application process take?

It may take the government agency (United States Citizenship and Immigration Services or USCIS) up to 90 days or more to process an OPT application. Your International Student Counselor may be able to provide a current estimate of processing times. However, processing times are unpredictable so it is always best to apply early! You cannot begin working until you have received your Employment Authorization Card (EAD) in the mail from the government agency and until the start date listed on the EAD card. The ISSS office is not responsible for the length of time required to process your OPT application.

To learn more about the OPT Process, please review the OPT presentation video and information available on the Office of International Affairs website.

9.PROGRAM FORM SAMPLES

The following forms can also be found via the Electrical and Computer Engineering website under the Programs tab > Graduate Advising.